

Introduction of ICT to World Heritage Site in Luang Prabang, Lao PDR



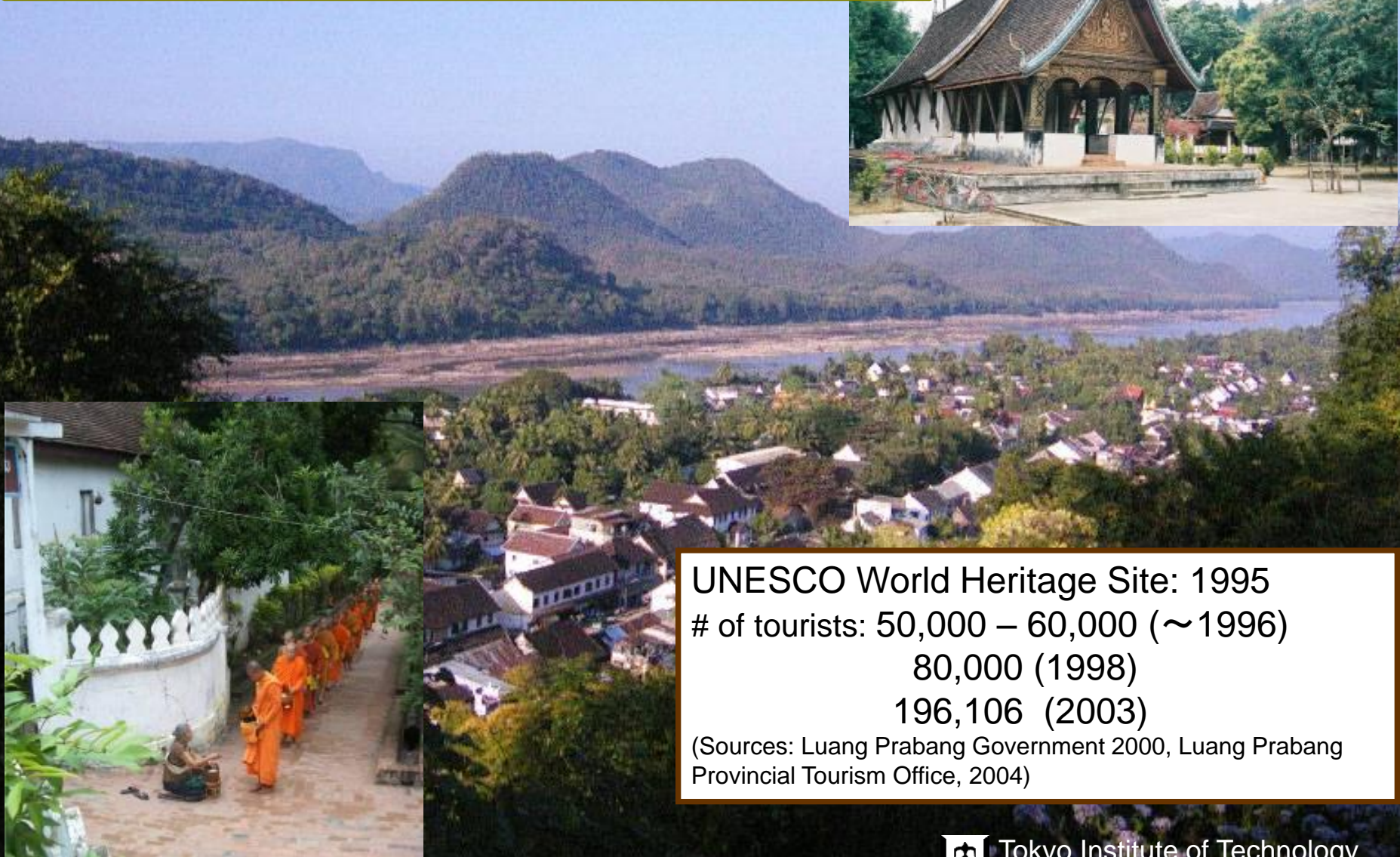
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Jun-ichi Takada

May 29, 2012

Sustainable development and
Integrated management



UNESCO World Heritage town of Luang Prabang



UNESCO World Heritage Site: 1995
of tourists: 50,000 – 60,000 (~1996)
80,000 (1998)
196,106 (2003)

(Sources: Luang Prabang Government 2000, Luang Prabang Provincial Tourism Office, 2004)

World Heritage Site & Development

World Heritage Sites have not only positive impacts but also negative impacts

Illegal construction and
changing landscape



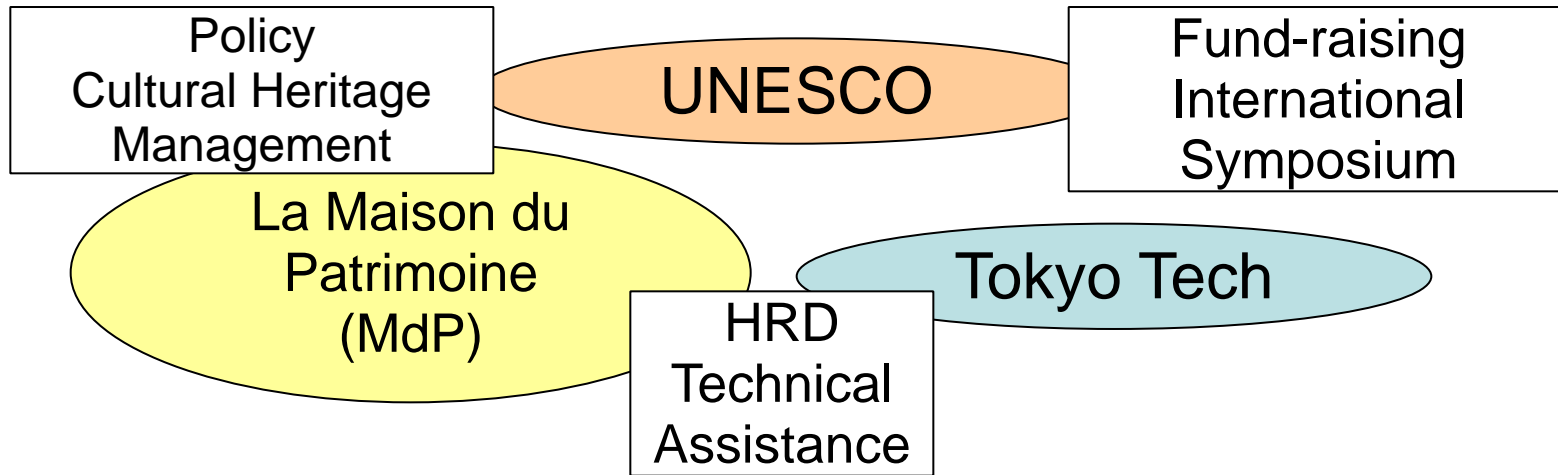
**Need for specific
policy
Information sharing
Education**

Unplanned infrastructure

Increased traffic &
illegal parking

Project Background (as of 2004)

Tripartite Collaboration



- **ICT contribution**
 - *“ICT itself is not an element which makes people wealthy, but it could accelerate development for the local population by facilitating access to information and communication, thus complementing benefit of other fields.” (ITU, 1984)*

Needs Assessment

Application of ICT (2004)

Participation to the seminar
“Fighting Poverty through
Heritage” organized by
UNESCO

Field survey

- Interviews at local sites
- Questioners at local sites
- Site observation

Meeting with Heritage
Committee

Discussion and brainstorming
with counter-parts

Needs Analysis

Which kind of
technology?

What befits?

Who are
target users?

Who? & How to
maintain ?

Project components (Phase 1: 2005-2008)

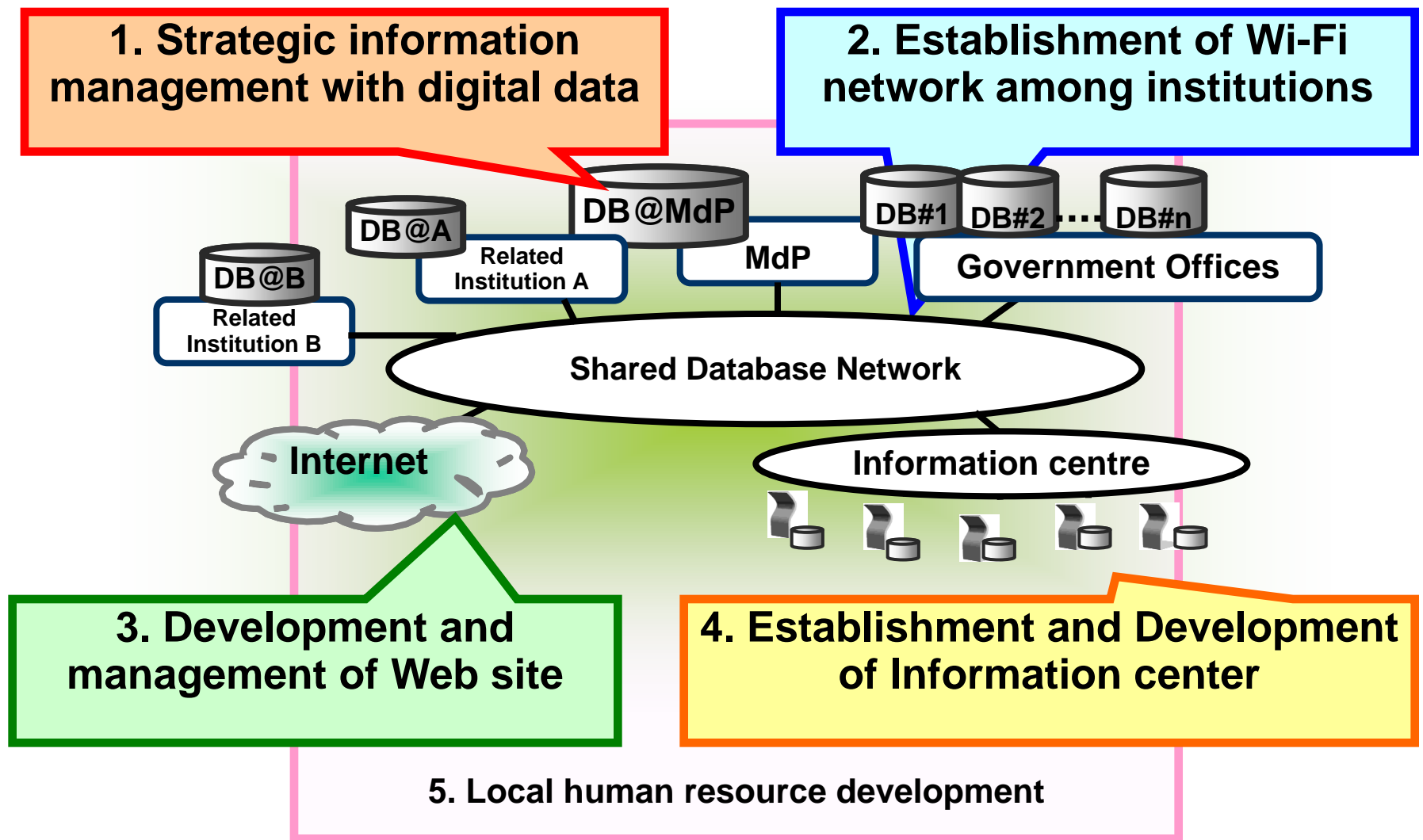


Figure 1 Identified model from needs analysis

Source: brainstorming and meeting in MdP, Luang Prabang, Lao PDR, Jan 2005

1. Strategic information management with digital data

The previous situation

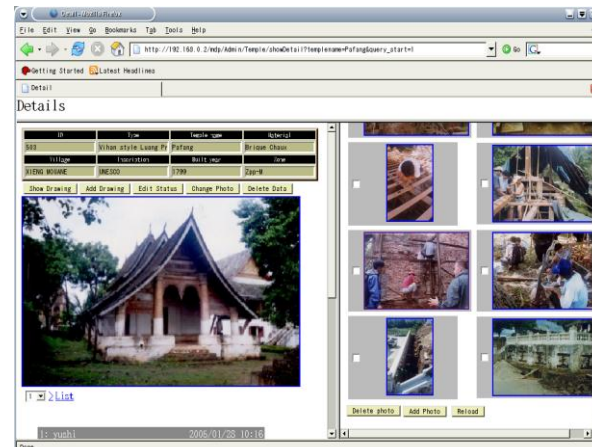
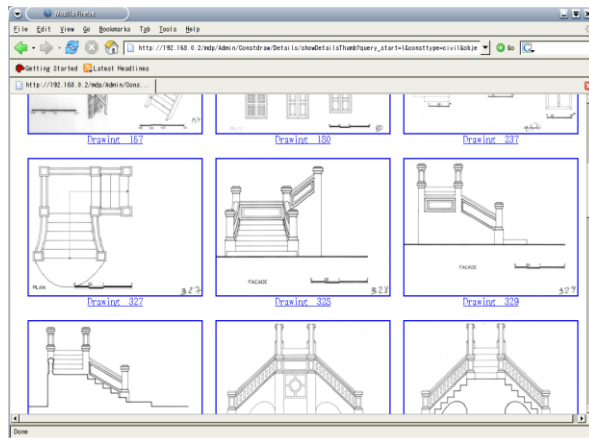
- Under-utilization of the abundant information
 - Paper-based data
 - Stand alone system



- Keep the data in good condition
- Be shared among institutions
- Be disseminated to the Internet



- Client-server system
- Web-based user interface
- Free and open source software (FOSS)
 - Sustainability = legality and cost performance
- Digitization of information
 - Thousands of drawings and photos are scanned.

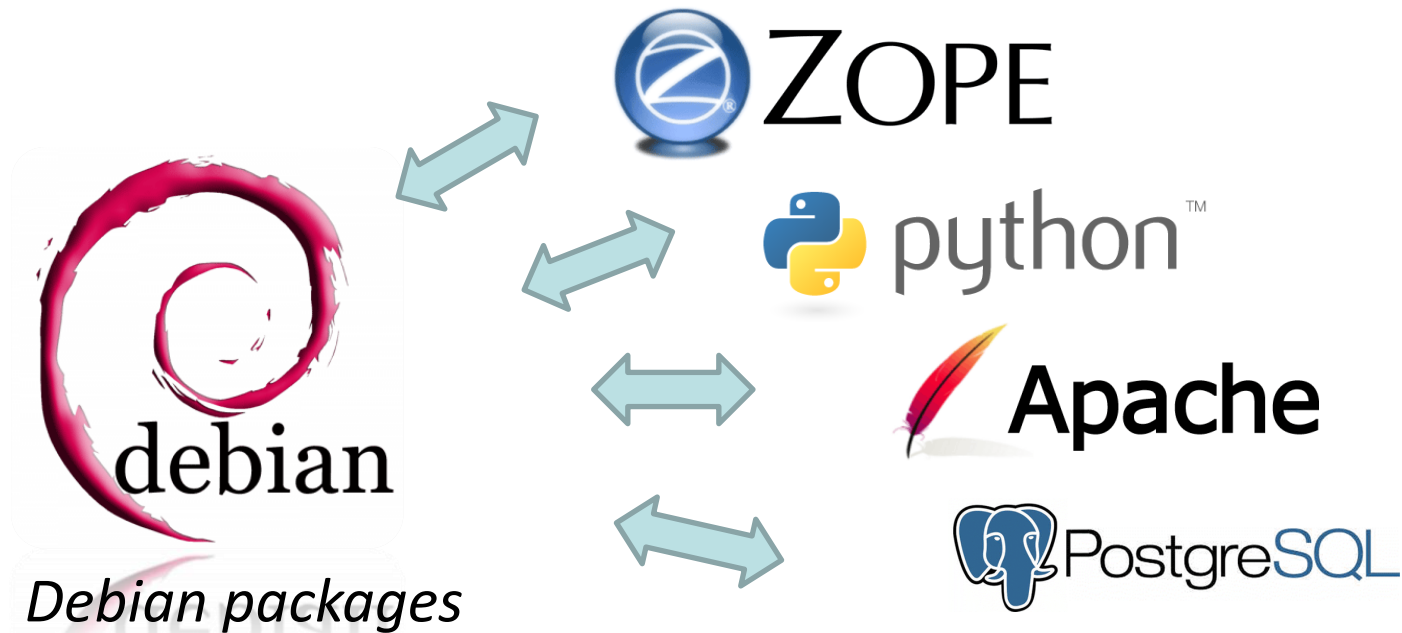


1. Strategic information management with digital data

Development of Database System

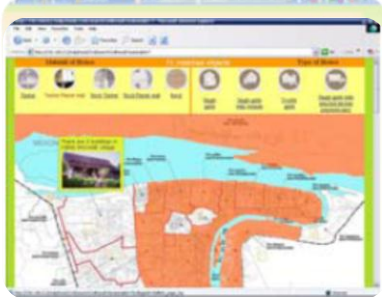
Software Components

- ◆ FOSS (Free and Open Source Software)
 - Cost-free and Legality for sustainability
 - Human resource is more important
- ◆ Based on Debian GNU/Linux Operating System

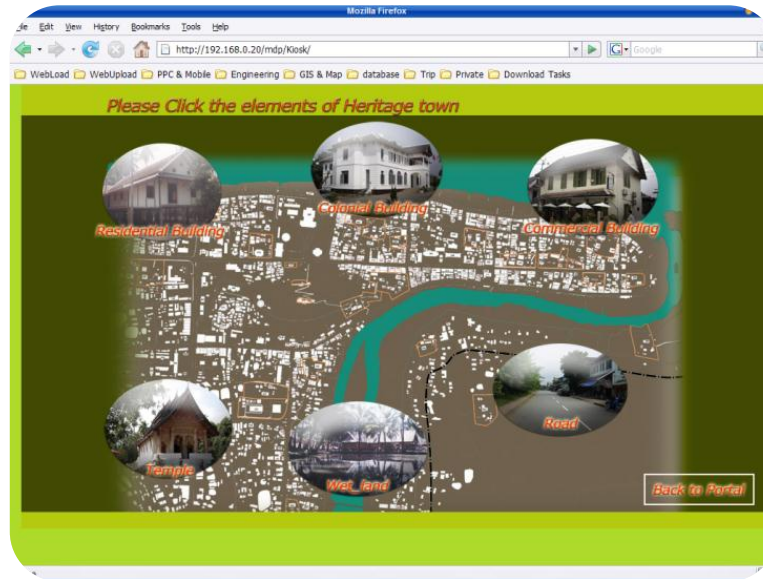


Heritage Database

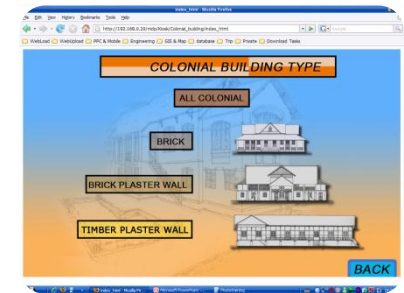
- ❑ Document protected objects in heritage zone area
- ❑ 611 buildings, 183 wetlands, 240 roads and 2,870 architecture drawings



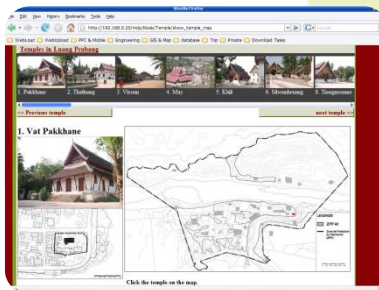
Vernacular buildings



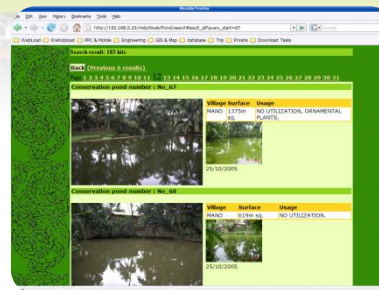
Shop houses building



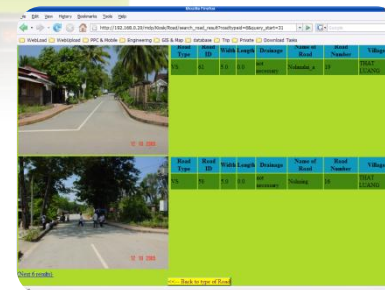
Colonial building



Monasteries



Wetland



Road

Heritage Database in ICT center, (2007)

Authorization Database

- ❑ To facilitate Authorization Unit of Department of Luang Prabang World Heritage.
- ❑ Authorization process by compiling information on permission and recommendation of constructions.
- ❑ 320 authorization cases between 2001 and 2008

- ❑ The structure of authorization database was carefully designed in close cooperation with architects from Authorization Unit of DPL.

- ❑ Searching the cases by four categories
 - Applicant information
 - Building location
 - Building information
 - Administration information

Authorization Database version 1.0

Search Form

Applicant Information

Applicant:

Location

Inventory:

Village:

Zone:

Company:

Building Information

Type:

Material:

Kind of work: ☐ Destroy ☐ Extension ☐ Restoration ☐ Soil work

Category:

Office Information

Reference App:

Date Apply:

Date Sent:

Reference Id:

Application Information Form

Applicant Information

Applicant name:

Age:

Occupation:

Telephone:

Village:

district:

province:

Country:

Location Data:

Application Information

Category:

Village name:

Inventory No:

Date App:

Date Record:

Zone:

Type building:

Material:

Reference Comment

Kind of work: ☐ Destroy ☐ Extension ☐ Restoration ☐ Soil work

Land title holder:

Authorized person:

Inspector:

Reference Out:

Reference In:

Heritage Committee

Heritage committee:

Date sent:

Date received:

Reference comment:

Comment:

Attachment file:

Architect name: Company:

Drawing file:

General Building and Construction Control Database

- Disorganized Data Management for General Buildings in PSMV.
- The Large Number of Buildings and its difficulties for Management.

Important Functions:

- 1) Gather all General Information of Buildings Within World Heritage Site
- 2) Monitor Unauthorized Constructions in the Heritage Site.

- ❑ 743 buildings in six villages which were collected through extensive field survey.
- ❑ In addition to general information, the database manages the record of unauthorized constructions found from 2001 to 2005 and most recent activities in 2009.

The screenshot displays the 'General building database V.1' web application. It features a search function on the left with filters for Location (Zone, Village), Building information (Inscription Number, Temple type, Current Architecture, Original Architecture), and Office information (Staff Reference, Illegal activity, Authorized). The main area is divided into 'General Building Information' and 'Illegal Construction' sections. The 'General Building Information' section includes fields for Owner Name, Zone, Village, Year Construction, Description, Inscription Number, Surface Ground Area, Surface Floor Area, Land Size, Ground Coverage, Current CDS, Original CDS, Zone type, Vegetation, Number Tree, Number Uninhabitant, Current Number entry, Original Number entry, Number room, Current Industry, Original Industry, Current Architecture, Original Architecture, Current Building, and Original Building. The 'Illegal Construction' section includes fields for Staff Reference, Illegal activity, Authorized, Authorization Number, Date illegal, Illegal name, Material, Extension, and common illegal. A 'Photo' section at the bottom allows for uploading images. The interface is designed with a green header and orange accents for section titles.

2. Establishment of Wi-Fi network among institutions

Previous situation

- No permanent internet connection
- No government LAN
- Expensive PCs



Networking among government institutions

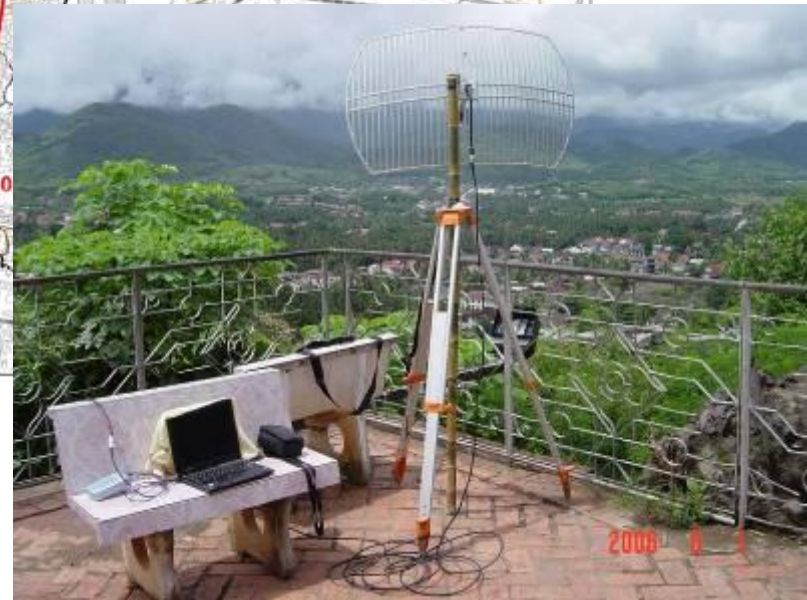
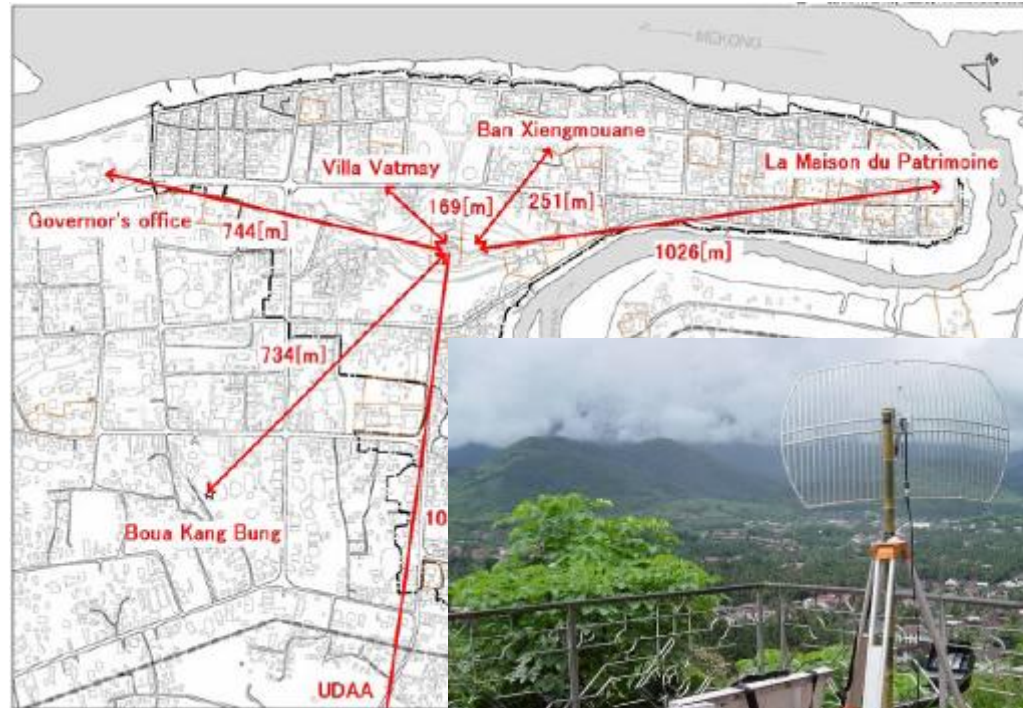
- To promote information sharing
- Complementing the collaboration among related institutions

Why wireless?

- Support better townscape
- Cost efficiency both on initial cost and running cost

Why Wi-Fi?

- Low price of the equipments
- Popularity
- License-free under specific conditions
- Lots of practices in the world



4. Development and operation of the ICT Center

The previous situation

- Insufficient access to information on public services and valuable cultural heritage



The ICT center aims to

- Provide public information to the local people
 - To provide necessary information in daily life
 - To encourage public awareness
- Provide tourism information
 - To provide tourist's better information to promote extended stay (thus increased economic contribution)
- **Educate younger generation**
 - **For basic computer use**
 - **For the well educated human resource for town development and tourism**



Self-sustainable operation

- Self-sustainable financial cycle
- Reflection of the user's needs/feedback

4. Development and operation of the ICT Center



Located next to the first rehabilitated building (planned for ethnic museum)



ICT center

- Traditional Lao style building
- First floor: ICT center
- Second floor: ICT team office

4. Development and operation of the ICT Center

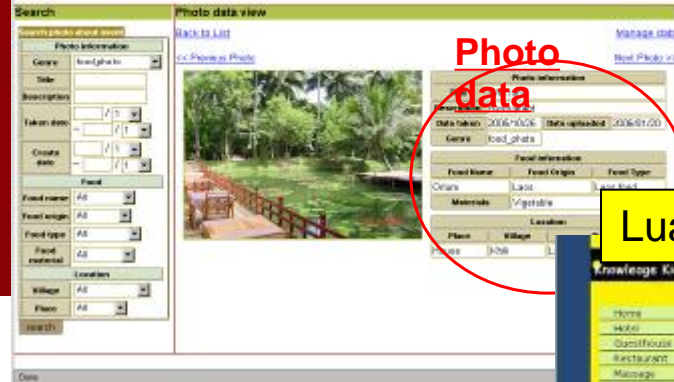
Database on
Heritage buildings, roads, and wetlands



Information on MdP and Luang Prabang



Photo Database on People and Culture
of Luang Prabang



Luang Prabang Yellow pages



Contents in service

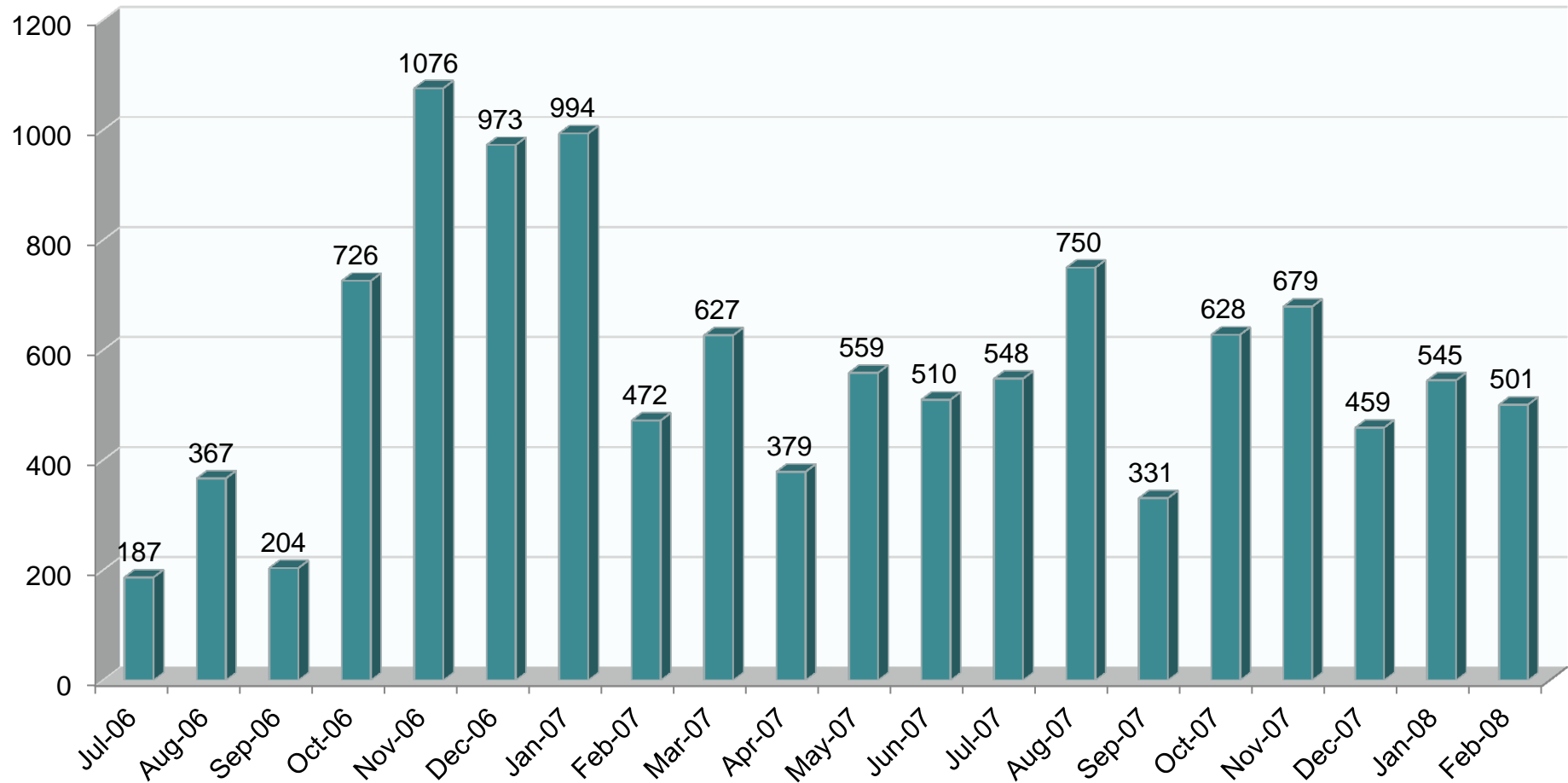
4. Development and operation of the ICT Center



The first pilot site of ICT Center: Preliminary Monitoring

Number of Visitors from July 2006 to Feb 2008

Total visitors = 11 515

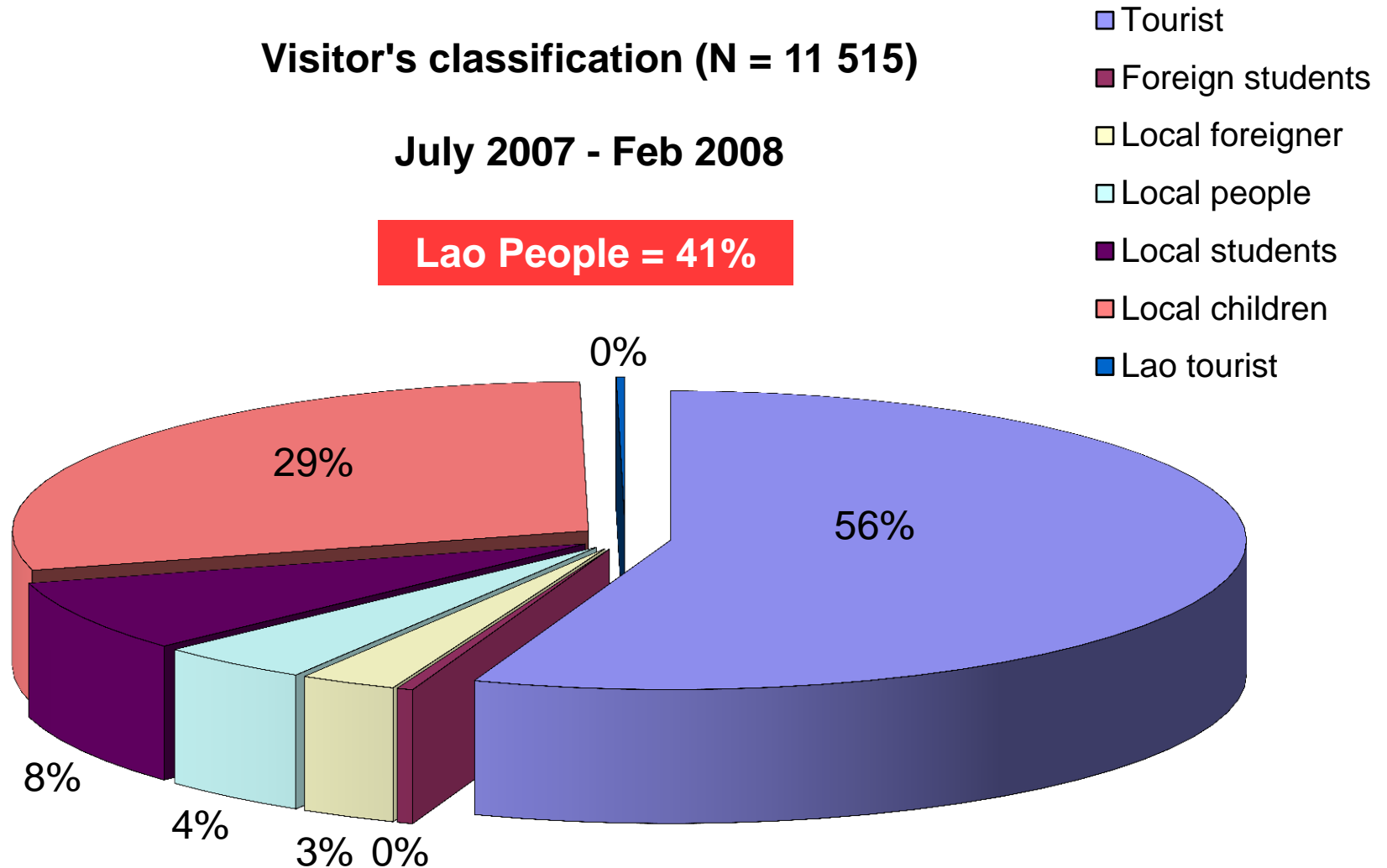


The first pilot site of ICT Center: Preliminary Monitoring

Visitor's classification (N = 11 515)

July 2007 - Feb 2008

Lao People = 41%



The first pilot site of ICT Center: Preliminary Monitoring

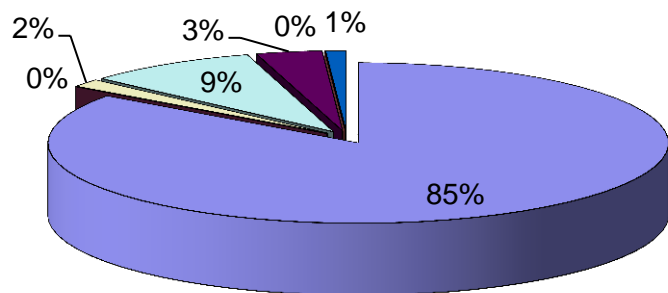
Chronological increase of local people in ICT Center

(July 06 – Jun 07)

July – Sep 2006

(N=758)

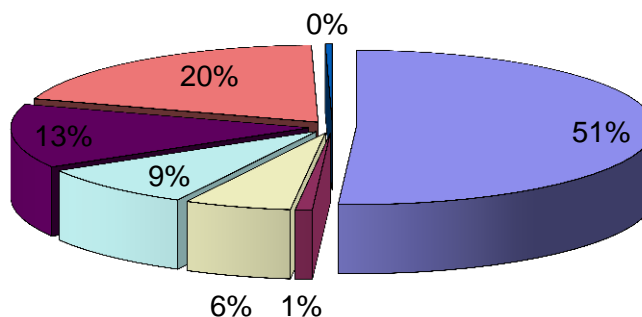
Lao People = 13%



Oct – Dec 2006

(N=2775)

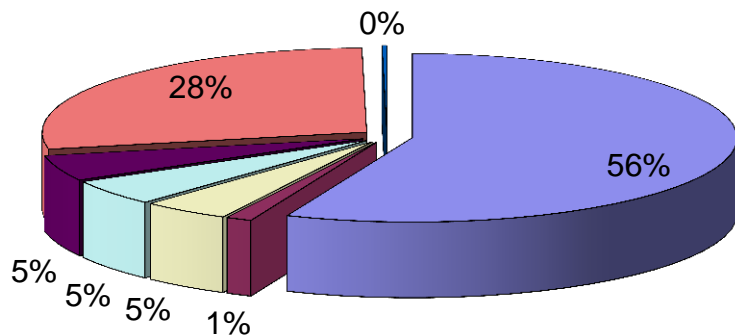
Lao People = 38%



Jan – Mar 2007

(N=2093)

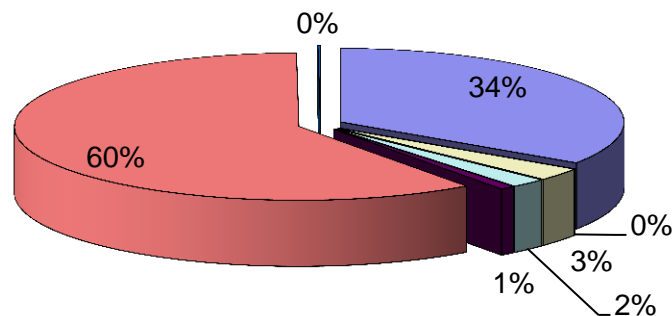
Lao People = 38%



Apr – Jun 2007

(N=1448)

Lao People = 63%



- Tourist
- Foreign students
- Local foreigner
- Local people
- Local students
- Local children
- Lao tourist

ICT Center Users: Local Youth, Government Officials and Tourists



Photos taken by ICT team, (2007 - 2008)

Local activity 1: Organization of local children art competition and exhibition

75 participants

32 hand drawn

43 computer drawn



Local activity 2: Short lecture on ICT to students of Souphonouvong University

30 IT Undergraduates

Lecture on

Database applications

Open source software

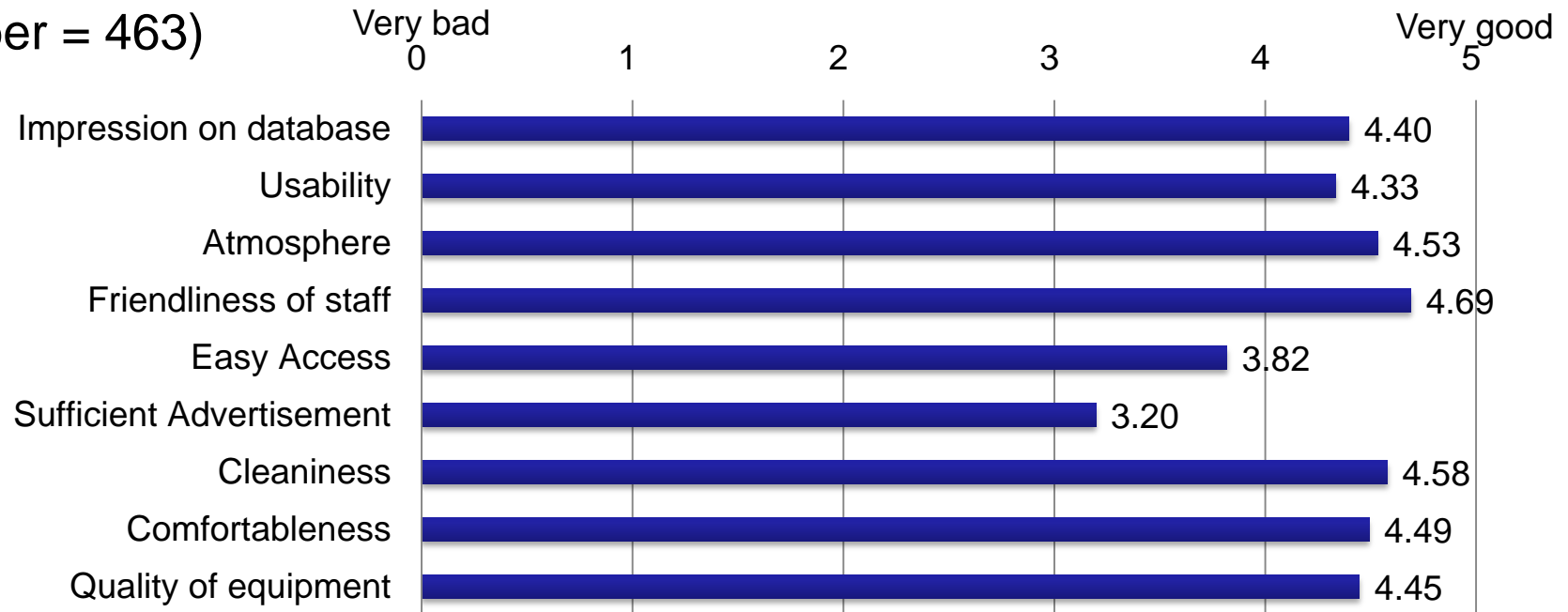


Photos taken by ICT team, (2007, 2008)

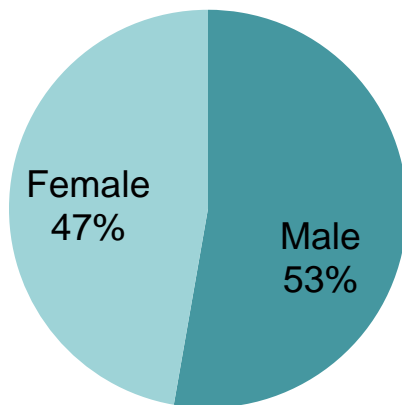
Feedback from the foreign visitors

July 2006 – Feb 2008

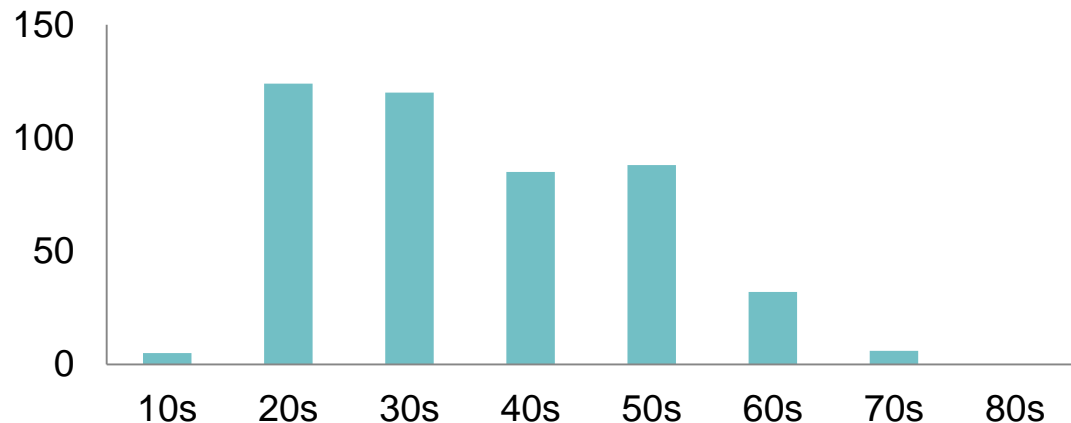
(Number = 463)



Gender of Visitors



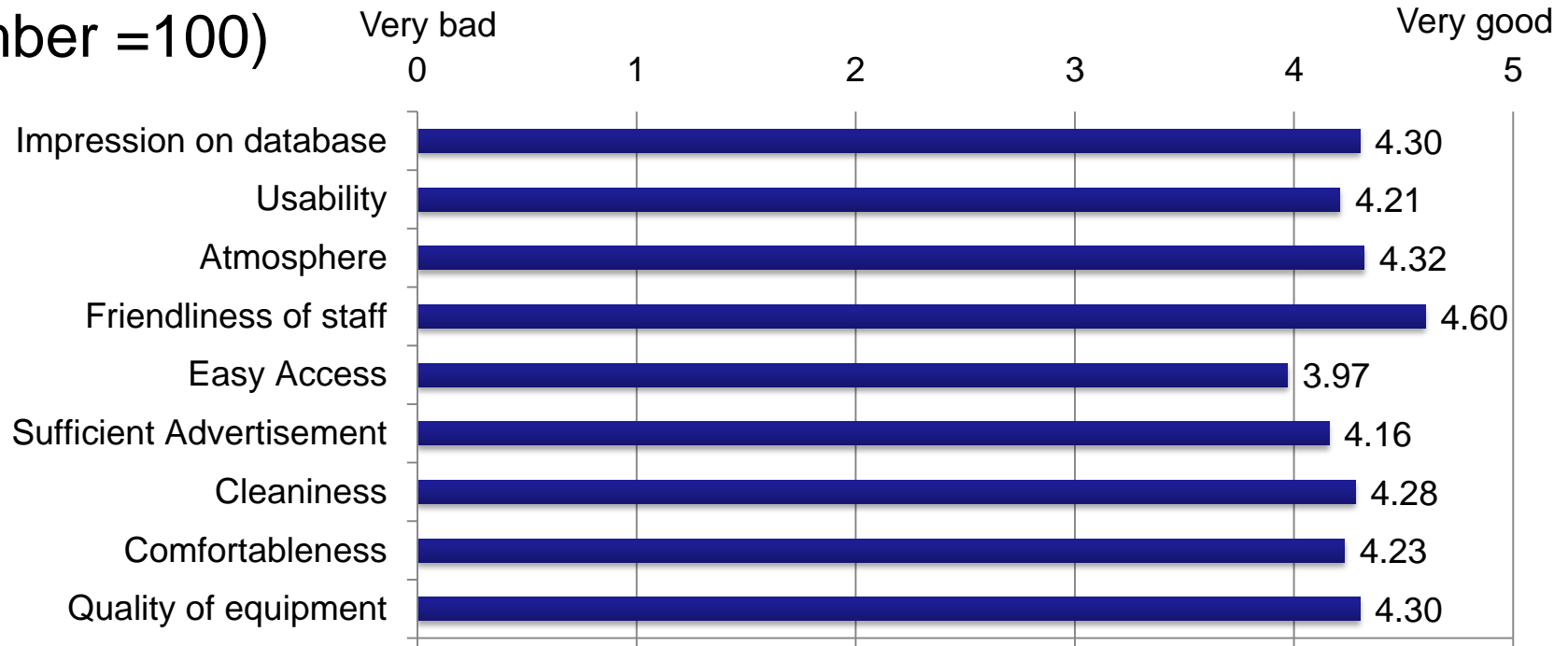
Age of Visitors



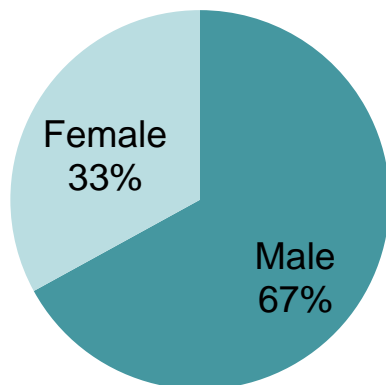
Feedback from the local visitors

July 2006 – Feb 2008

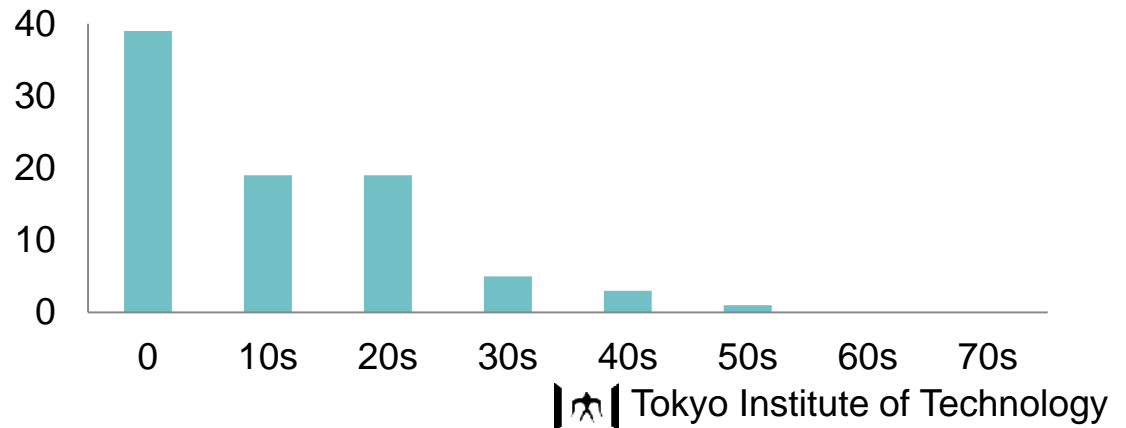
(Number =100)



Gender of Visitors



Age of Visitors



Feedback comments from the local visitors

Lao people should know old histories.

Add more drawing of temples and other cultural heritage.

Internet access is desirable

Updating information is important. Insert dates to the info.

Demonstrate in a symposium

More historical event pictures such as the old king

Great opportunity for young generation to learn about heritage conservation and protection

School children “we can use computer and read more books”

“I enjoy drawing houses and animals” from children in local drawing competition

Excellent ideas to show Lao culture and tradition.

Don't close this center, we need it

More advertisement is suggested

Add information on nature and suggested visiting spots

More advertisement is suggested for local schools and travel agencies


Beautify surrounding with flower garden

Add Interactive games or competition,

5. Human resource development in ICT team


The previous situation

- No ICT engineer to implement and operate the project components
- Use of illegally copied software



Series of local ICT training workshops

- Establishment of local ICT team
- Needs-based practical training
 - The products from training were provided for daily use.
- Using FOSS



Contents of workshops – chosen upon demands

1. Development of web site
2. Administration of Linux server
3. Implementation of LAN
4. Development of web-based database applications
5. Design of data structure

5. Human resource development in ICT team



Local ICT workshops



Project Background (Phase 2: 2009-2012)

1995 **Luang Prabang**
World Heritage Site

Three Outstanding Universal Values

**Rapid increase
of tourists**

Development Pressure

Guesthouses, restaurants & tourist sites
Trigger constructions



**Possible change in landscape or
impact on Outstanding Universal Values**

2008

**World Heritage Committee
(Evaluation)**



Propose 15 recommendations

Recommendation No. 5 and 6: Updated
map of all buildings and inventory buildings



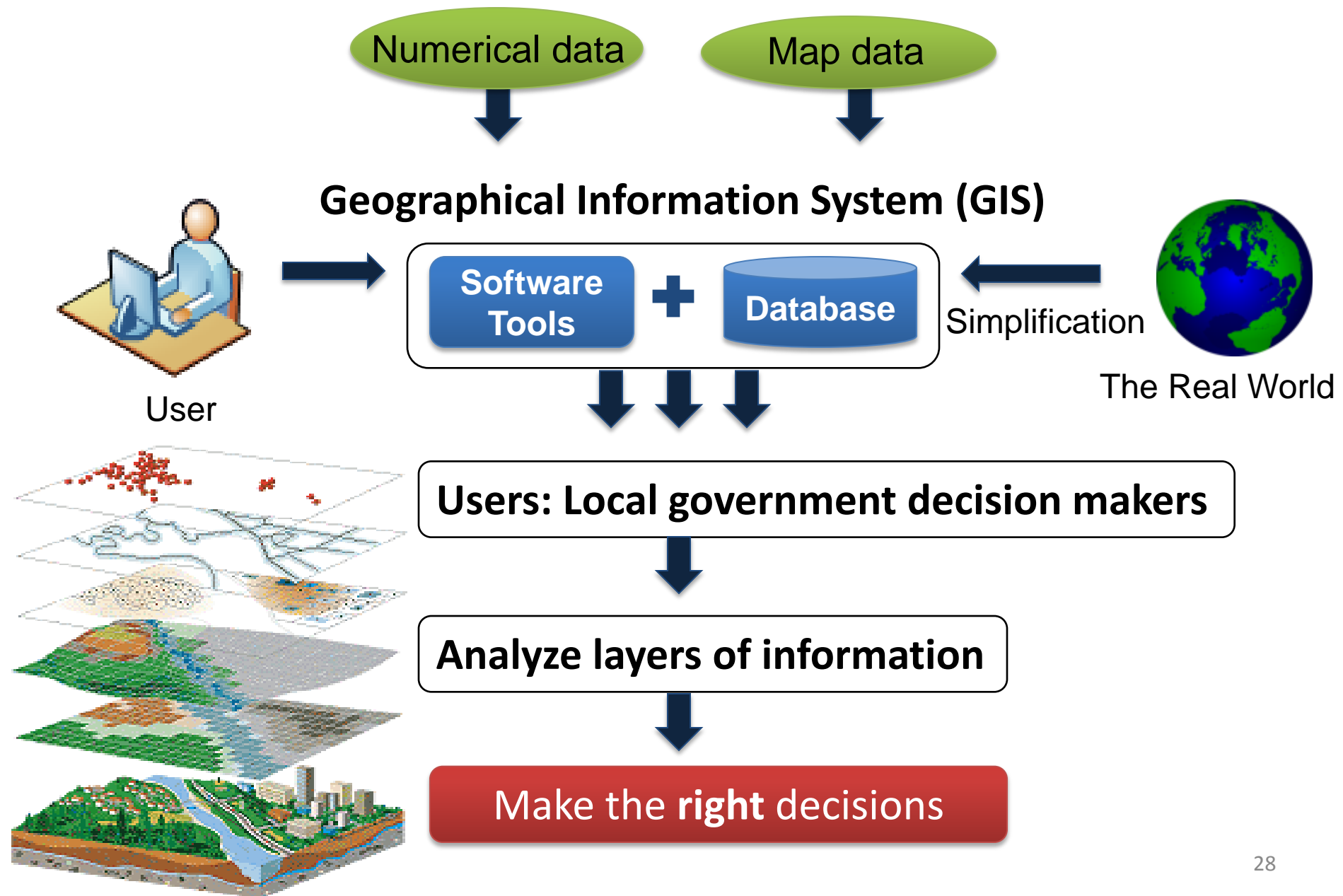
**Department of World Heritage
(Ministry of Information and Culture)**



Tokyo Institute of Technology

Introduce GIS (Geographical Information System) to visualize and analyze
the chronological changes in townscape affected by building constructions

What GIS Software can do?



Major Issues of Sustainable GIS in Luang Prabang

Data availability

- Lack of reliable geographical data e.g. X, Y coordinate
- Need specific base map for building

Major issues in sustainable deployment of GIS

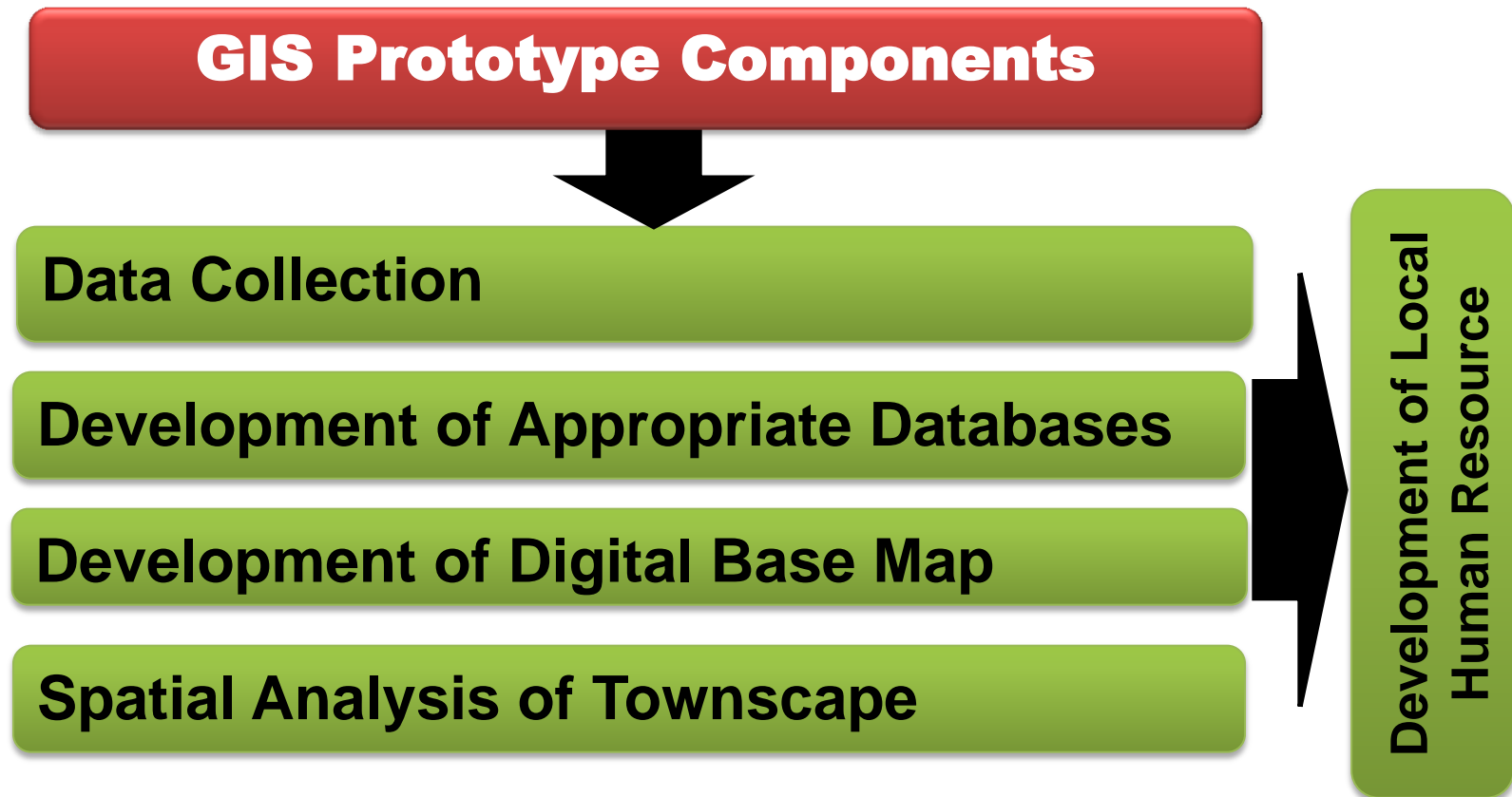
Data management

- Majority paper-based data
- Lack of compatible and standardized base maps

Complex scale of implementation

- Large scale GIS is complicated
- Require a lot of human resource

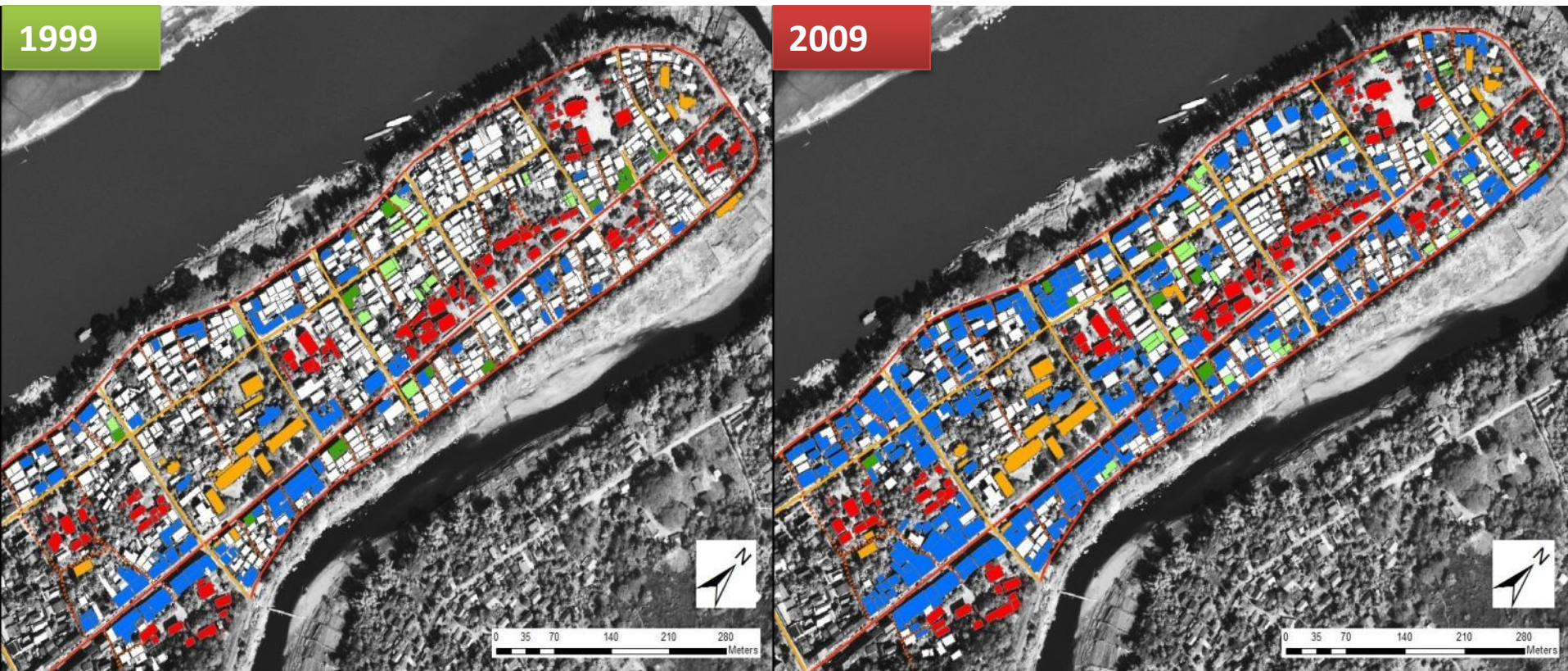
Development of GIS Prototype












Example of spatial analysis

Building usage

Transition of building usage from residence to touristic



Legend

	Resident		Government		Main roads
	Touristic		Mixed resident and small business		Streets
	Religion		Commerce		Small Tracks/Paths